

tion (two lectures), and its applications (three lectures); and Electromotive force (two lectures). References to important papers are given by footnotes. At the end of the volume is an index both of subjects and of authors' names, but we look in vain for a table of contents to aid the reader in following the scheme of presentation. The translation is excellent throughout, and well worthy of the accuracy of the original.—B. E. LIVINGSTON.

#### A premedical text-book.

THIS GENERAL TEXT-BOOK of botany<sup>3</sup> is written for premedical and pharmaceutical students in particular and the nonprofessional undergraduate incidentally. Like most German works of its sort, it is divided into three parts: first, a general treatment of the organogeny and cell structure of plants; second, their physiology; third, the general morphology of representatives of the great plant groups. Of these three, the greatest stress is laid upon the first part, which reflects in great measure the views of Goebel as found in his *Organographie* in much detail. The chapters treating of respiration, photosynthesis, and other plant functions are much more elementary, as is the general morphology. There is a wholesome admixture of new illustrations with the time-worn veterans that the author apparently hadn't the heart or the courage to drop by the wayside. In the treatment of what the author calls the "Spezielle Botanik" there is no description nor figure of the sex organs of the liverworts or mosses, and none of the sexual generation of the water ferns, equisetum, selaginella, isoetes, gymnosperms, and angiosperms. The groups of flowering plants described seem to have been selected largely because members of the order afford commercial products. The stamens and pistils are referred to as "geschlechtsorgane." This is an anachronism that does not accord with the views expressed on the alternation of generations, which are quite up to date.—FLORENCE M. LYON.

#### MINOR NOTICES.

THE FLORA OF PENNSYLVANIA, in preparation many years by the late Professor Thomas C. Porter, has appeared under the editorship of Dr. John K. Small.<sup>4</sup> It consists of a list of gymnosperms and angiosperms with stations, and is the result of personal exploration and extensive cooperation of others for a period of over sixty years. Professor Porter's ambition was to make his list of Pennsylvania plants complete, and this led him to defer printing it from time to time. When death overtook him in his eightieth year, the work seemed to him not yet perfect enough for publication, but a provision in his will for its publication has enabled Dr. Small to present it to the public. The summary shows that it records 2201 species, which have

<sup>3</sup> GIESENHAGEN, K., Lehrbuch der Botanik. Imp. 8 vo. pp. xii + 475. figs. 557. Stuttgart: Fr. Grub. 1903.

<sup>4</sup> PORTER, THOMAS CONRAD, Flora of Pennsylvania. Edited with the addition of analytical keys by John K. Small. 8vo. xv + 362. Boston: Ginn & Co. 1903. \$2.15.

been brought together with more painstaking care, probably, than has ever been used in the preparation of a catalogue of plants.—J. M. C.

A SECOND EDITION of Professor Atkinson's book on *Mushrooms* appeared recently from the press of Henry Holt & Company.<sup>5</sup> The new volume contains ten illustrations which did not appear in the first edition. The value and attractiveness of the work are further enhanced by a chapter on the cultivation of mushrooms, illustrated by half-tones of mushroom houses and flashlight photographs of mushroom beds in abandoned mines in New York and Pennsylvania. This chapter gives a good account of the status in the United States of an industry of whose existence probably few are aware. Methods of culture and marketing mushrooms are fully discussed in this chapter.

The typography and half-tone work of this edition are of the same excellent character as in the first edition, making it an exceedingly attractive work.—H. HASSELBRING.

THE SIXTH FASCICLE of Engler's great work on the genera and families of African plants was published in the spring of 1901, and just now, nearly three years later, the seventh fascicle<sup>6</sup> has made its appearance. It is a presentation of the genus *Strophanthus* (Apocynaceae) by E. Gilg, who recognizes 43 species, only one of which is new, but 8 of which are of recent publication by the author. The 10 lithographic plates, one of them colored, are models of illustrative work.—J. M. C.

### NOTES FOR STUDENTS.

DIXON has examined the temperature difference between subterranean organs and the soil by a special thermopile.<sup>7</sup> He finds generally no higher temperatures than those of the soil and no diurnal periodicity other than is induced by periodic fluctuations of external temperatures. The adaptation of apparatus and discussion of errors in thermoelectric measurement of temperatures have a positive value.—C. R. B.

BOUILHAC AND GIUSTINIANI<sup>8</sup> believe that mixtures of bacteria with such algae as *Nostoc* and *Anabaena* will prove of great economic value in soils that are poor in nitrogen. Cultures of buckwheat supplied with these forms developed normally in soils deprived of all other organic matter, and subsequent tests showed that large quantities of nitrogen had been fixed. The control cultures of buckwheat developed poorly.—H. C. COWLES.

<sup>5</sup> ATKINSON, G. F., *Studies of American fungi*. Imp. 8vo. pp. vii + 323. *figs.* 230. New York: Henry Holt & Co. 1903. \$3.

<sup>6</sup> ENGLER, A., *Monographien afrikanischer Pflanzen-Familien und -Gattungen*. VII. *Strophanthus*, bearbeitet von E. Gilg. 4to. pp. 48. *pls.* 10. Leipzig: Wilhelm Engelmann. 1903. *M* 16.

<sup>7</sup> DIXON, H. H., *Observations on the temperature of the subterranean organs of plants*. *Trans. Roy. Irish Acad.* 32B: 145-170. *pls.* 5-8. 1903.

<sup>8</sup> BOUILHAC and GIUSTINIANI, *Sur une culture de Sarrasin en présence d'un mélange d'algues et de bactéries*. *Compt. Rend.* 137: 1274-1276. 1903.